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RANDO-WEBBER RANDO-FEEDER MACHINES

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TEXTILE DIVISION
CURLATOR CORPORATION
ROCHESTER, NEW YORK

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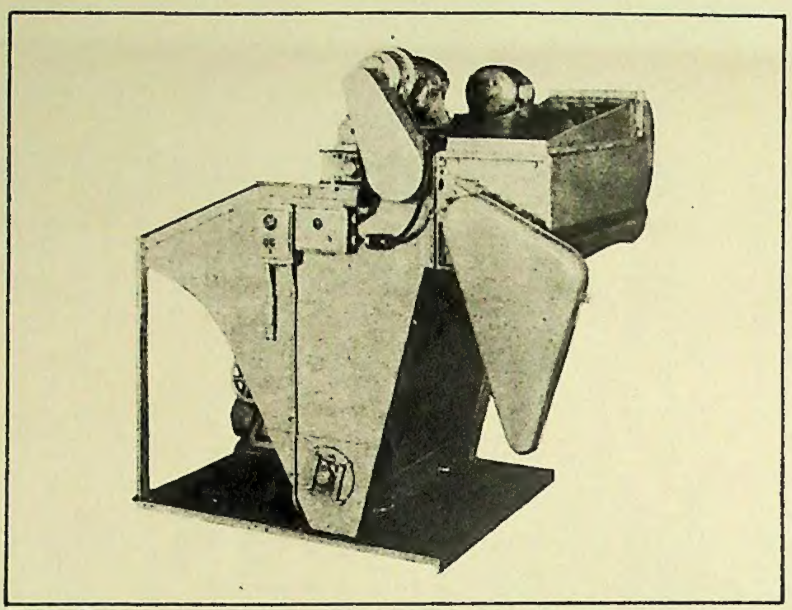

FIG. 2
*RANDO-FEEDER, MODEL 40

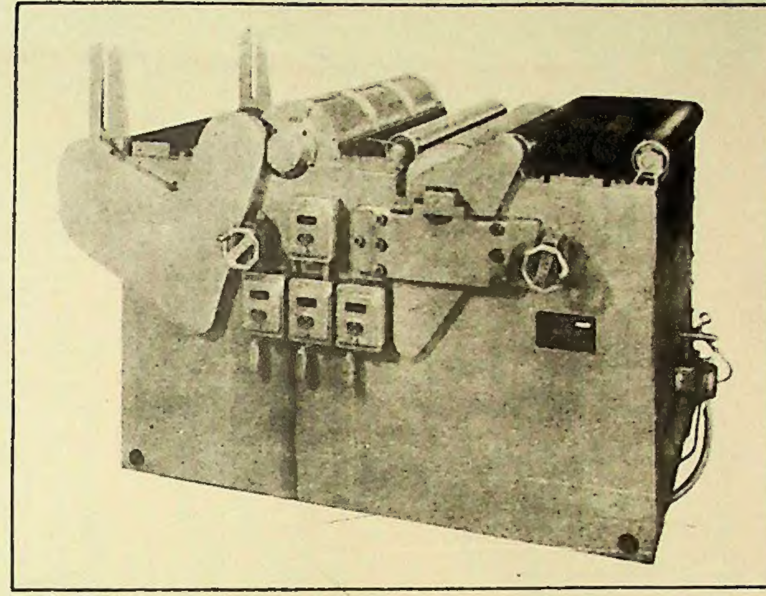

FIG. 3
*RANDO-WEBBER, MODEL 40

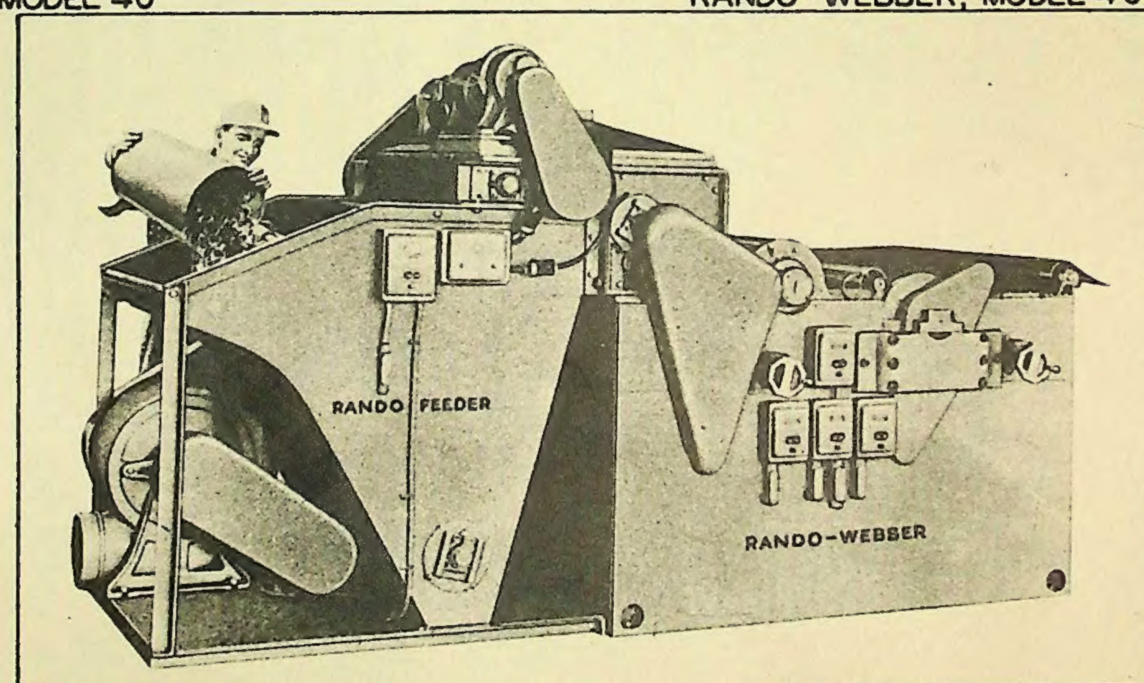

FIG 4
*RANDO-WEBBER, MODEL 40, SHOWN WITH *RANDO-FEEDER, MODEL 40

*TRADE MARK
PATENTS GRANTED
AND PENDING - U.S. &
FOREIGN COUNTRIES

I. THE RANDOM WEB PROCESS - ITS ORIGIN AND DEVELOPMENT.

The RANDOM WEB PROCESS produces a random or non-oriented web suitable for processing into felts, wadding, heavy mats, and non-woven fabrics on a continuous basis. In this way a product having balanced physical properties is produced without the use of cross-laying devices as is now common practice in the felt industry. An important advantage in the process is the ability to process a number of low cost, short staple waste fibers as indicated in Table 1 of the enclosed data. In this way there may be an initial saving in fiber cost and further satisfactory end products may be produced that would not be practical in conventional methods.

Webs weighing $\frac{1}{2}$ ounce up to 8 ounces per square yard are now produced on the 40 inch machine at capacities ranging up to 35 pounds per hour. A variable speed drive on the condensing unit regulates the weight of the web (see Table 3). To produce webs or mats heavier than 8 ounces per square yard, it appears necessary to laminate the webs by mounting the required number of machines over a traveling conveyor similar to a wadding card line. See Figure 12 for suggested arrangement.

The RANDOM WEB PROCESS is the result of a development carried on over a period of several years. By the end of 1946 the process had been successfully developed through the 10 inch laboratory stage. The first two 40 inch pilot models of the web machines were then designed and built. These machines were used by respective mills to develop new web products.

After practical operation in these mills, the 40 inch pilot unit was redesigned, manufactured and tested for commercial use and designated the Model 40, RANDO-WEBBER.

As this program of development work progressed it became more and more evident that a major problem would be a suitable feed for the RANDO-WEBBER. Two requirements became evident: first, uniformity of feed, both lengthwise and crosswise, and second, an ability to handle the large number of low cost, short staple waste fibers in loose form submitted by prospective customers. The RANDO-FEEDER was developed in the same manner as the RANDO-WEBBER to meet this need.

The form and arrangement of the operating parts of the RANDO-WEBBER is shown in Figure 1. The feed and opening mechanism is somewhat like the feed and licker-in assembly of a cotton card. The condenser is unique in that the air is directed through it without either a change of speed or direction of air flow at the critical point of fiber deposit on the screen. There is used a unique method of doffing fibers from the licker-in teeth. A careful balance has been worked out between the surface speed of the opening cylinder or licker-in and the speed of the air stream sweeping the fibers from the teeth. This is accomplished by a Venturi-like air duct connecting the opening unit to the condenser. The combination of centrifugal forces developed on the opening cylinder along with the higher air velocity in the Venturi-like throat results in sweeping the fibers off the tips of the licker-in teeth in a positive and continuous doffing action. Thus the doffing is accomplished without the use of any supplementary stripping means such as a doffing cylinder,

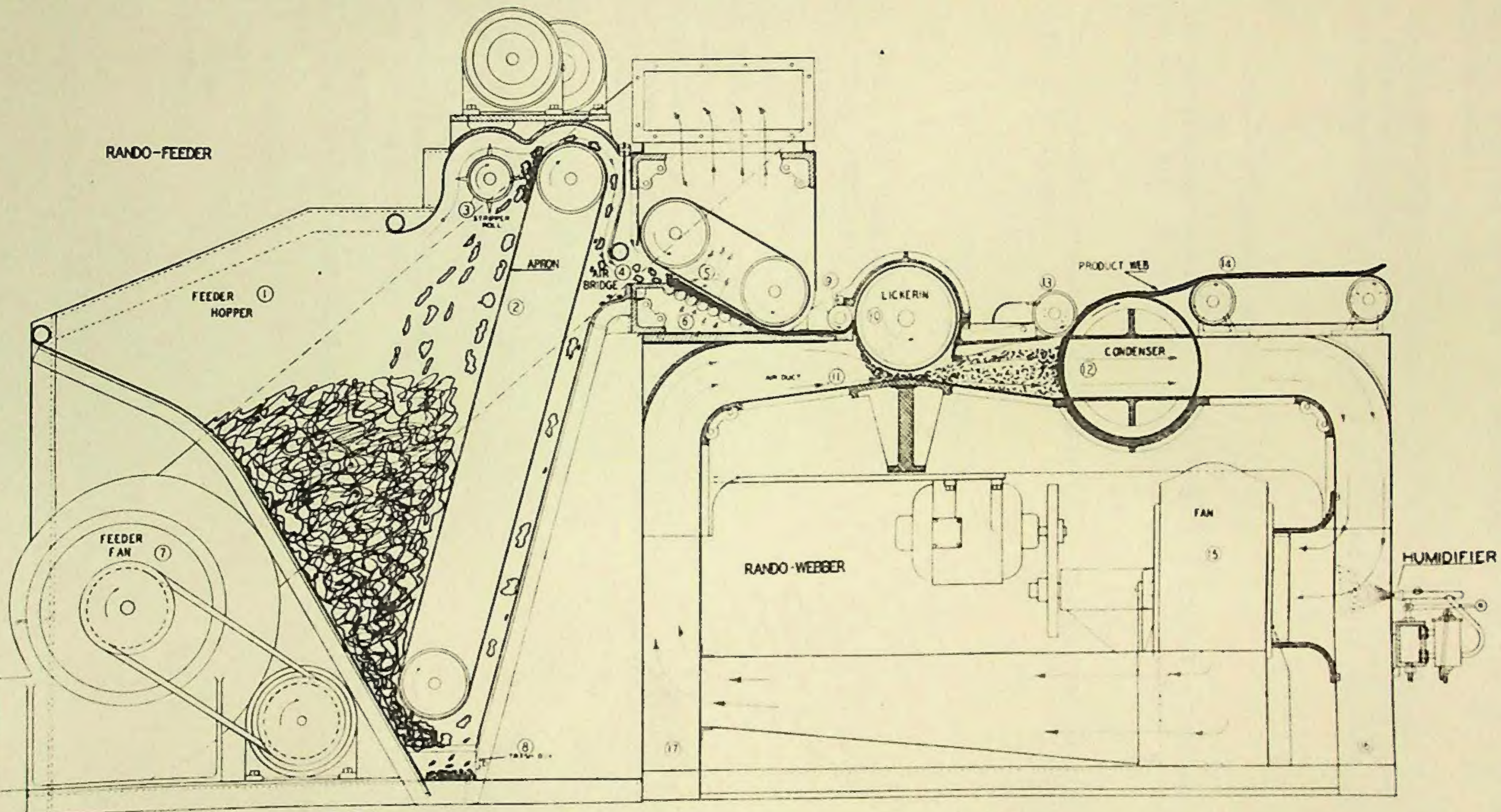

FIG. I
FLOW DIAGRAM COMBINED RANDO-FEEDER AND RANDO-WEBBER

vibrating comb, knife, brush or air jets. Careful consideration has been given to the establishment and maintenance of streamline air flow in the critical sections of fiber stripping and web formation so as to produce uniform webs.

The RANDO-WEBBER is operatively clean. There are no hang-up points for stock to gather or to start roping. All surfaces in contact with the air borne stock are of non-corrosive materials and are finished surfaces.

II. WHAT IT DOES - SUGGESTED PRODUCTS.

As previously stated the RANDO-WEBBER produces a random or non-oriented web or mat of fiber suitable for processing into a variety of end products.

The suggested products which may be produced from RANDOM WEBS may be listed as follows:

TABLE I
SUGGESTED PRODUCTS

1. HEAVY MATS
    - a. Car floor mat backing
    - b. Hard floor backing
        - (1) Rubber tile
        - (2) Plastic tile
        - (3) Linoleum
    - c. Rug Cushions
    - d. Rug backing
    - e. Insulation
        - (1) Thermal
        - (2) Acoustical

2. INDUSTRIAL NON-WOVEN FABRICS
    - a. Laminate reinforcements
        - (1) High pressure
        - (2) Low pressure
    - b. Reinforcements for molded plastic articles
    - c. Base for coated fabrics
        - (1) Leatherettes
        - (2) Shoe and slipper linings
    - d. Tapes
        - (1) Electrical grade
    - e. Filters
        - (1) Milk
        - (2) Chemical

3. WADDING
    - a. Industrial Grades
        - (1) Automotive grade
        - (2) Upholstery backing

3. WADDING (Cont'd).

(3) Packing Materials
(4) Casket Linings
b. Clothing Interlining
c. Surgical goods

4. FELT

a. Industrial grades
b. Automotive grades
c. Clothing accessory items

5. HOUSEHOLD NON-WOVEN FABRICS

a. Tapes
(1) Decorative ribbons
(2) Gummed utility tapes
b. Disposable household items
(1) Towelling
(2) Tablecloths, place mats
(3) Napkins
(4) Curtains
(5) Bedspreads
(6) Tea Bags
(7) Wiping cloths
c. Surgical materials
(1) Dental towels
(2) Hospital and surgical pads
d. Disposable personal items
(1) Diapers
(2) Tissues
(3) Handkerchiefs

TABLE 2

FIBERS THAT MAY BE PROCESSED WITH MARKET PRICES. *

Fiber	Cost/Pound
Reclaim Tire Cord	$ .01 - .03
Napper Flocks	.03 - .04
Heather Waste	.03 - .05
Cotton Linters	.04 - .08
Jute Waste	.05 - .08
Garnetted cotton clips	.09
Axminster Loom Waste	.02
Cotton Mill Waste	.06 - .22
Cotton thread waste - cut or garnetted	.12 - .19
Cotton comber noils	.27
Rayon mill waste	.06 - .18
Rayon thread waste - cut or garnetted	.12
Rayon - garnetted noils	.18 - .25
Garnetted wool waste	.10 - .14
India cotton	.25

TABLE 2 (Cont'd.)

FIBERS THAT MAY BE PROCESSED WITH MARKET PRICES. *

Fiber	Cost/Pound
Acetate Rayon	$ .43 - .45
Viscose Rayon	.43
American cotton	.30 - .33
Wool noils	.40 - 1.10
Plasticized Cellulose Acetate "PLAS-TECA"	.70 - 1.10
Vinyon HH Resin Staple	.83
Nylon	1.50 - 1.75

III. HOW IT WORKS

The stock flow may be traced through both machines by reference to the flow chart Figure 1 of the RANDO-FEEDER and RANDO-WEBBER. The stock is shown in Red, the air flow in both machines is shown in Green, and trash or waste removed from the stock is shown in Black.

Stock enters the combined machines (RANDO-FEEDER and RANDO-WEBBER operating as a unit) by means of the hopper (1) of the Feeder, Figure 1. The Feeder hopper (1), the elevating apron (2) with its slats and pins and the stripper follow usual practices. A high speed stripper roll is shown in place of an oscillating rake. In operation fiber is lifted out of the hopper on the pins of the apron. The pins of the stripper roll knock off excessive fiber leaving small bunches or tufts on the individual pins of the elevating apron.

The apron and stripper continue to raise fiber, strip off the excess and present fiber to the air stream (indicated by Green lines.) However, if the air stream does not exist or is feeble, the fiber remains on the apron pins, travels down the back side of the apron and returns to the hopper. Under the above conditions the mechanism described thus far may continue to operate indefinitely feeding no fiber to the remainder of the system.

The next section in the path of the fiber is called the air bridge (4). The fiber is carried across the air bridge into the wedge shaped opening in the screen box between the air screen (5) and the roller conveyor (6). The screen box is under suction pressure developed by the fan (7) the inlet of which is connected with an air tight duct to the header on top of the screen box. To satisfy this suction pressure atmospheric air must pass over the top of the apron through the constricted passage between the apron and the top cover. Additional air may be introduced, if necessary, by opening the adjustable louver between the top cover and the screen box. See Figure 5. In this way a relatively high air velocity may be developed over the apron pins which will sweep off the tufts or bunches of fiber held on the pins and carry

* NOTE: The above prices must be considered approximate because of wide market fluctuations particularly on waste fibers.

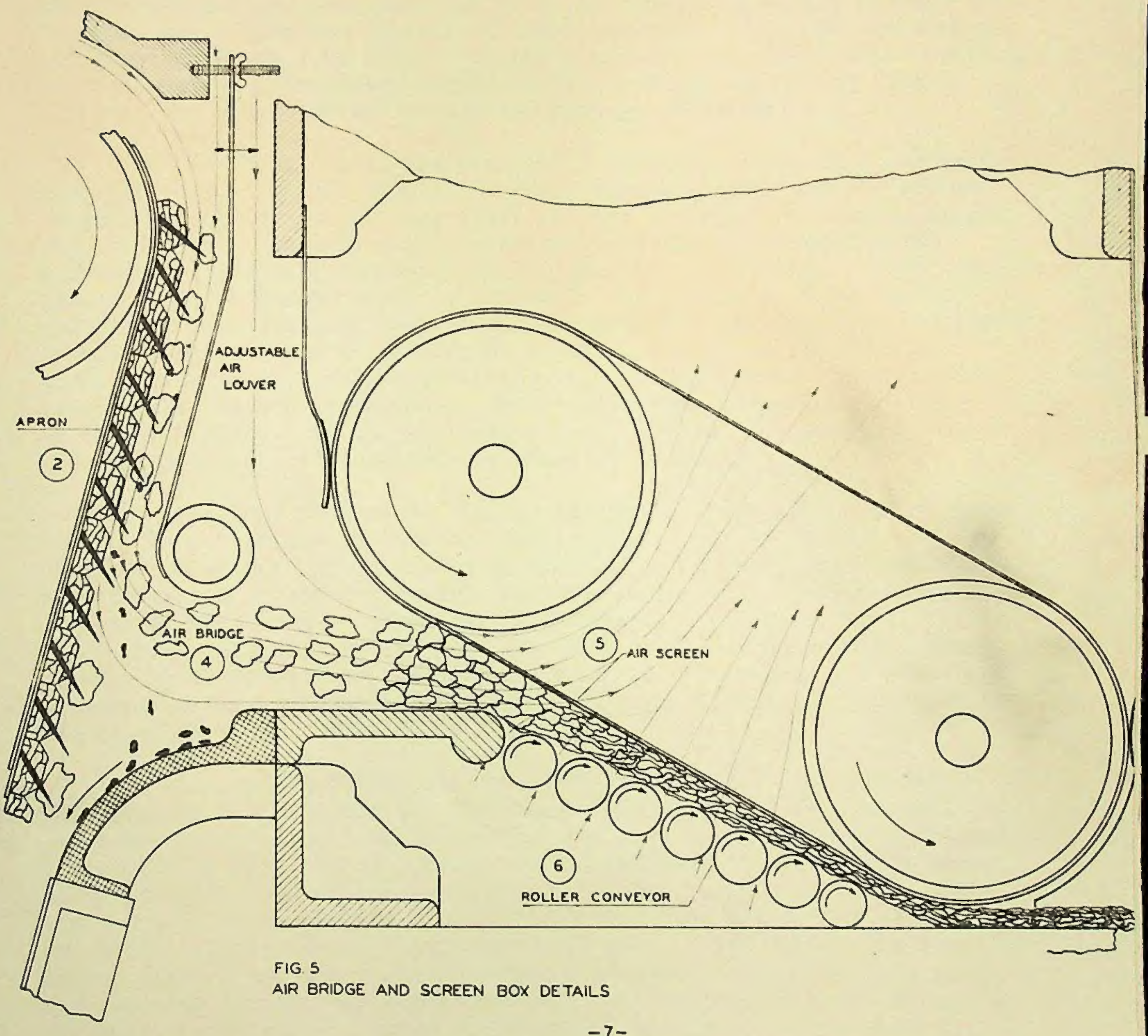

FIG. 5
AIR BRIDGE AND SCREEN BOX DETAILS

them over the air bridge to the throat between the traveling screen and ahead of the wedge formed between the screen and the self-rotating conveyor rolls. Conversely, if there is no appreciable air velocity over these pins the fiber will not be swept off and deposited in the throat of the screen wedge.

The suction pressure forms and tightens the fiber in the wedge between the traveling screen and roll conveyor and thus increases the resistance to the flow of air through the wedge of fiber. When the wedge is full there is not sufficient velocity in the air flow over the apron pins to strip them. The wedge of fiber is constantly moving forward to the feed end. With the removal of fiber the velocity of the air stream increases to strip more fiber from the pins. It is evident that stripping and feeding are inter-related by a sensative variation of the flow of air over the pins, the air bridge and through the wedge of fiber.

As the width of the machine is 40 inches there may be slightly unequal packing in this throat and there may be a localized air current of sufficient strength to pick fiber off the adjacent pins on the apron. Thus there is a constant and practically instantaneous equalization crosswise of material presented in the throat of the wedge. The steady movement of the screen which is driven by and geared to the variable speed feed roll drive of the web machine assures even formation lengthwise. Provided there is sufficient stock in the hopper to fill the apron pins with tufts after stripping, hopper level has no appreciable effect upon the hourly weight of fiber delivered. Furthermore, there is little variation in the unit weight of the resulting feed mat over wide ranges of stock processed per hour.

Another feature of the air bridge is the elimination of tramp metal. An air stream of more or less intensity lifting fibers off the pins is not of sufficient intensity to lift relatively dense materials and carry them across the bridge into the wedge section, even though such tramp metal may be entangled with fibers. Therefore, metal, wood, often burrs, etc., pass down the back side of the apron into the tray (8) at the bottom of the apron (see Figure 1). This tray has grid bars arranged to permit the returning fiber to pass without again picking up the trash that has collected in the tray.

The RANDO-WEBBER receives the mat of fiber from the RANDO-FEEDER as shown in Figure 1. The mat is picked up by the feed roll (9) journaled into the concave surface of the nose piece of the feed plate. This fiber mat is tightly compressed and fed over the tip of the nose piece into the path of the teeth of the licker-in cylinder (10). The individual fibers are picked or pulled out of the mat by the tips of the teeth sweeping by at relatively high speed. The fibers are carried on the tips of the teeth past a restricted clearance between the teeth and the nose bar and through an arc of approximately 80 degrees into the high air velocity section or throat of the Venturi-like duct (11). At this point the air stream (Green lines) developed by fan (15) has a velocity higher than the surface speed of the licker-in teeth. The fibers (shown in Red) are swept off or doffed from the teeth into the air stream completely on the downstream side of the licker-in and are subsequently deposited on the circular screen of the condenser (12). Details of this action are shown in Figure 6.

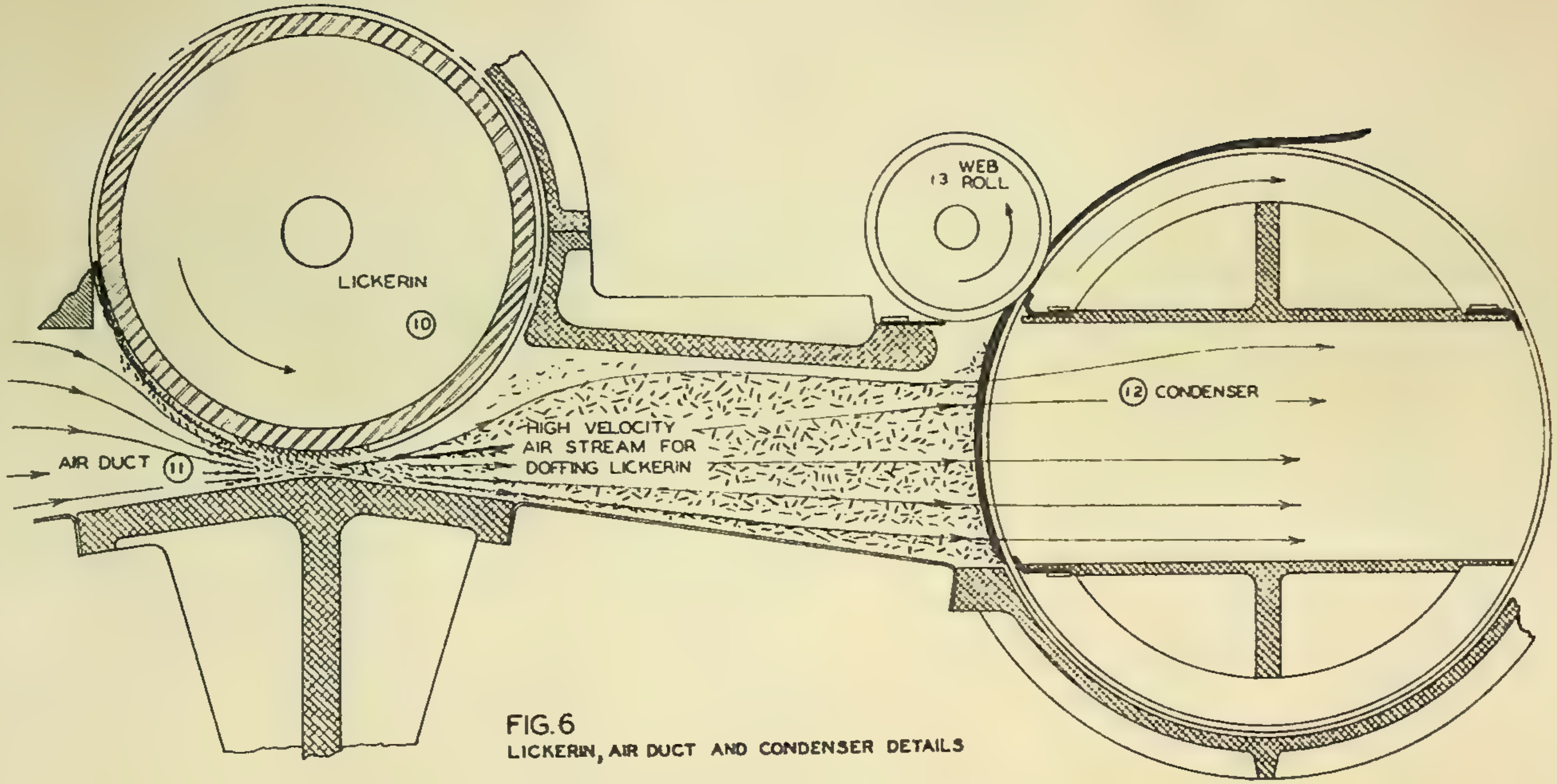

FIG. 6
LICKERIN, AIR DUCT AND CONDENSER DETAILS

The web machine operates on the return air flow principle. The air flow can be traced throughout the web machine by following the Green lines. See Figure 1. The fibers are deposited on the screen section of the condenser but the air, of course, goes through the wire mesh, being confined in a duct within the condenser of the same cross sectional area as the adjoining duct system. By carefully sealing the screen section no disturbing air currents interfere with fiber deposit and web formation on the screen. The straight-line air flow at this point, without a change in speed in the critical region, is important in obtaining uniform fiber deposit. This return air flow system operates cleanly as dust or other trash small enough to go through the screen settles out of the air stream in pockets (16) and (17) at either end which can be cleaned out periodically by removing clean-out panels provided at both ends of the machine.

A further and still more important reason for using the return air flow system is to make it possible to condition the air. This will diminish or eliminate the generation of static electricity with all its resultant problems. A humidifier is installed at the inlet side of the fan as shown in Figure 7 on the web machine. In operation a super-saturated air steam is maintained so that free water particles exist in a fog-like condition. The resulting high humidity of the air stream probably eliminates the generation of static in the first place or at least super-saturation provides a means of dispersing the static charges through fog-like particles, in addition to the fibers, all of which carry charges downstream to be discharged on the metal of the machine. Thus the potential of the static charge is greatly diminished if not eliminated.

Reference to Figure 1 shows that the fiber collects on the screen of condenser (12) which is slowly rotating in a clockwise direction, and a random, uniform web is deposited on the screen and carried out of the machine on the screen between the web roll (13) and the condenser screen. This web flows continuously to the rubberized belt conveyor (14) for subsequent transfer to the next machine in the manufacturing process.

IV. CONSTRUCTION DETAILS OF THE MODEL 40, RANDO-WEBBER.

A study of Figures 8 to 11 inclusive suggests several machine variations from which to choose a combination for optimum results with a specific fiber stock to be processed. Only a few representative examples are illustrated. The following variations are possible.

1. Licker-in Teeth (compare Figures 8 and 9).
   (a) Size
   (b) Shape
   (c) Spacing

2. Nip length - the arc of pressure on the fiber between feed roll and the concave surface of nose bar.

3. Combing arc - length of arc from tip of nose

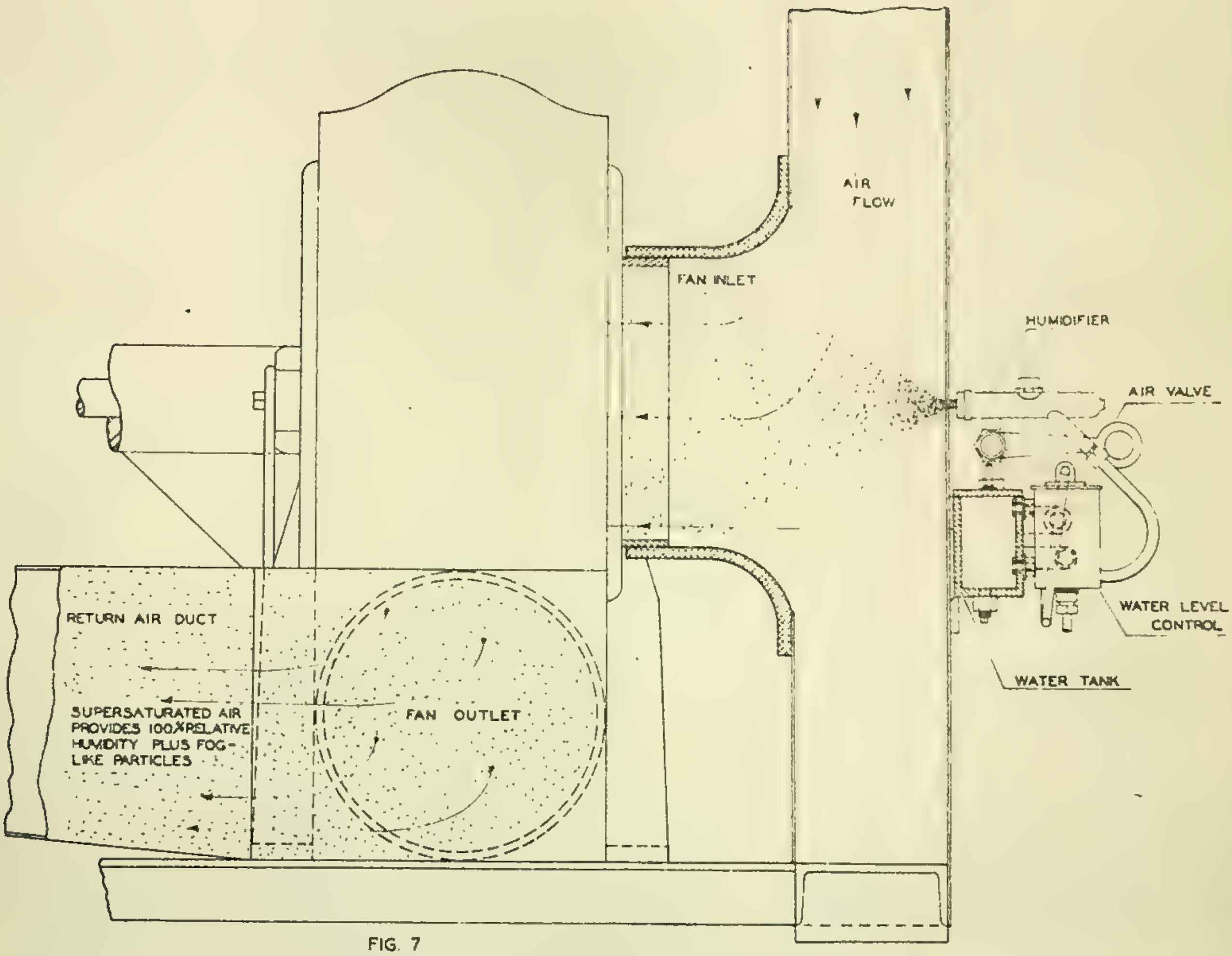

FIG. 7
HUMIDIFIER AT FAN INLET

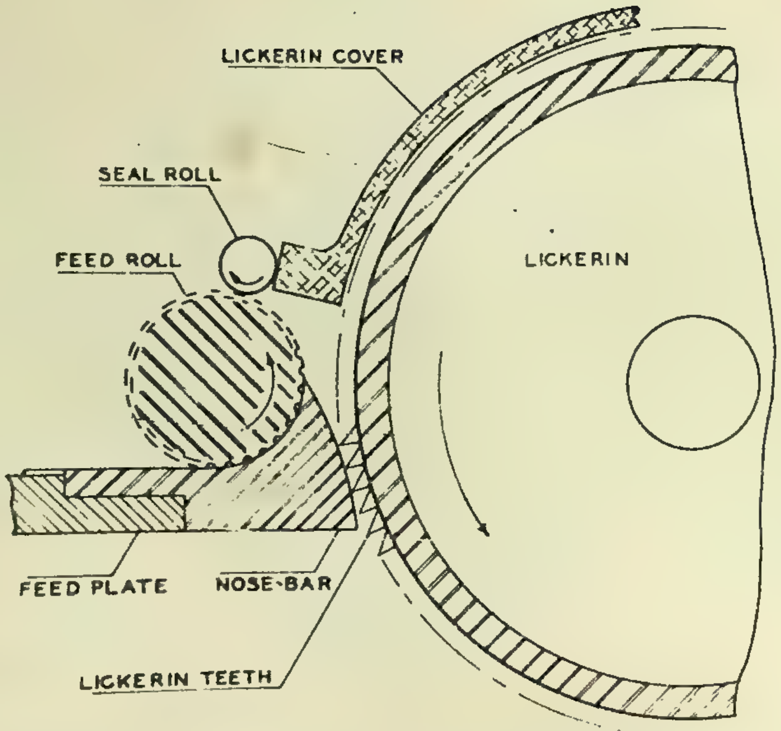

FIG. 8
FEED ROLL, NOSE BAR AND LICKERIN DETAILS. COARSE CARDING ACTION. COMPARE WITH FIG. 9

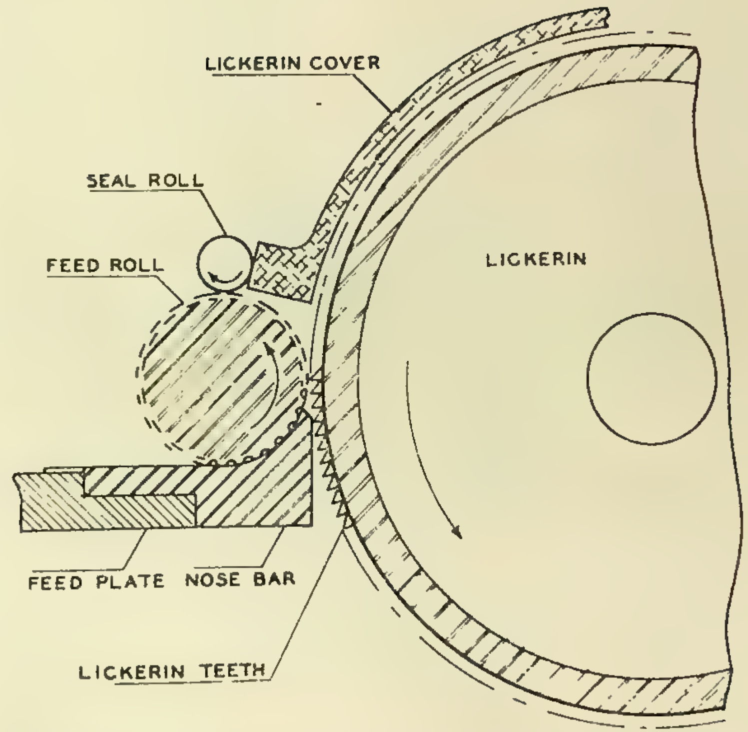

FIG. 9
FEED ROLL, NOSE BAR AND LICKERIN DETAILS. FOR SHORT FIBERS AND FINE CARDING ACTION. COMPARE WITH FIG. 8

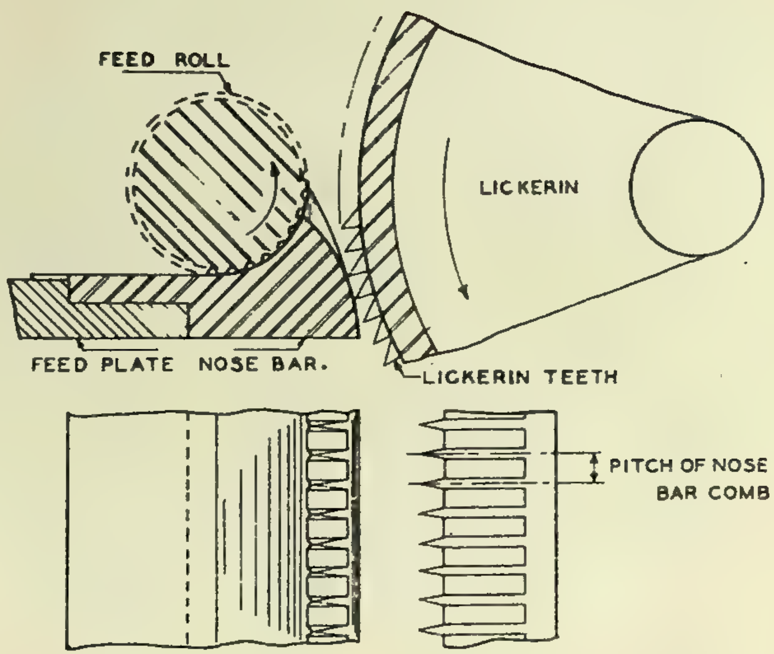

FIG. 10
NOTCHED NOSE BAR FOR LONG FIBER

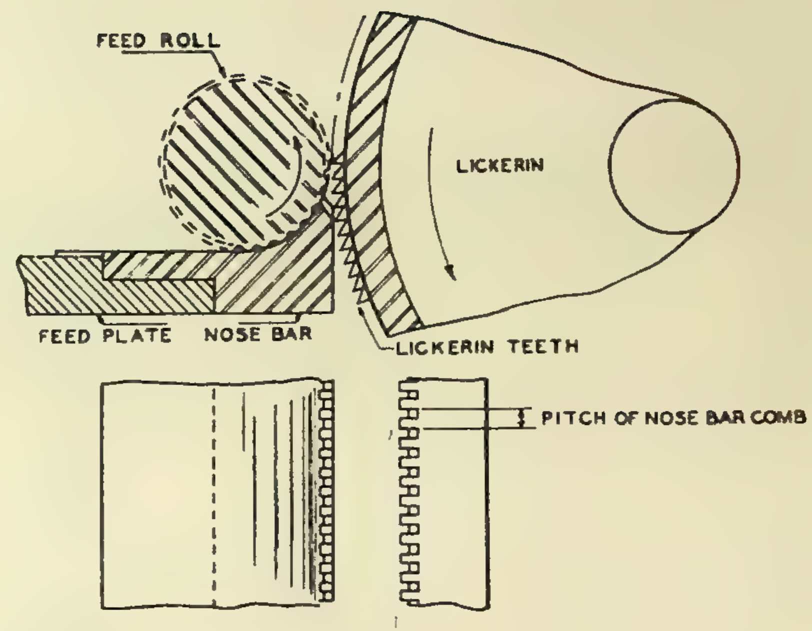

FIG. 11
NOTCHED NOSE BAR FOR SHORT FIBER

bar to line of tangency at point of minimum clearance between the nose bar and licker-in teeth. (Compare Figures 8 and 9).

4. Nose bar treatment.
   (a) Plain (See Figures 8 and 9)
   (b) Notched, including variations in the pitch, sharpness of teeth and groove depth. (See Figures 10 and 11).

The feed roll and condenser are driven by separate infinitely variable drives with convenient hand wheel adjusters on the operating side of the RANDO-WEBBER. These separate and infinitely variable drives provide for independent control of the feed and web formation. Table 3 relates the variable factors including (a) input, pounds per hour, (b) web weight, ounces per square yard, (c) linear and square yards of output per hour along with (d) the condenser dial setting. In practical operation the input or feed dial is set for maximum practical feed obtaining the required carding action and evenness of web. This is followed by adjusting the condenser dial to the required web weight. Table 3 provides an indication of the yardage output.

Laboratory web forming equipment is available for determining by trial the best combination for customer's stock and product conditions. In evaluating a given stock, the following factors are taken into consideration to achieve customer requirements to the best advantage:

1. Degree of stock opening or carding desired.

2. Allowable fiber breakage.

3. Removal of hard foreign matter such as burrs.

V. METHODS OF PROCESSING RANDOM WEBS INTO FINISHED PRODUCTS.

There are a number of ways by which RANDOM WEBS may be processed into finished or semi-finished end products, some of which are suggested in Table 2. First, the web may be processed directly into a finished product for the consumer or converting trade. Second, the material may be only partly finished and then dyed, printed, or coated later. Third, the material may be processed into some industrial item such as a laminate reinforcement. Fourth, the webs may be combined with other materials such as woven cloth or gauze, needle punched with other fibers or combined with paper as a component of a finished product.

Two methods of processing webs now in general use will be described below:

1. Plastic Fiber Method. *

In the "dry" or plastic fiber bonding process the binder fiber, for example Plas-Teca or Vinyon Staple, is first blended

* See Footnote on following page.

Sample Weight Grams (4"x4" Square)	Web Weight Ounces Per Sq.Yd.	CONDENSER DIAL SETTING											
		2.8	4.2	5.6	7.0	8.4	9.8	11.2	12.6	14.0	15.4	16.8	18.2
		LINEAR YARDS PER HOUR											
		50.3	75.5	100.6	125.8	151.0	176.2	201.2	226.4	251.6	276.8	302.0	327.2
		SQUARE YARDS PER HOUR											
		56.0	84.0	112.0	140.0	168.0	194.0	224.0	252.0	280.0	308.0	336.0	364.0
								POUNDS PER HOUR.					
0.2	0.57								9.0	10.0	11.0	12.0	13.0
0.3	0.86					9.0	10.5	12.0	13.5	15.0	16.5	18.0	19.5
0.4	1.14				10.0	12.0	14.0	16.0	18.0	20.0	22.0	24.0	26.0
0.5	1.43			10.0	12.5	15.0	17.5	20.0	22.5	25.0	27.5	30.0	32.5
0.6	1.72			12.0	15.0	18.0	21.0	24.0	27.0	30.0	33.0	36.0	39.0
0.7	2.00		10.5	14.0	17.5	21.0	24.5	28.0	31.5	35.0	38.5	42.0	
0.8	2.29		12.0	16.0	20.0	24.0	28.0	32.0	36.0	40.0			
0.9	2.57		13.5	18.0	22.5	27.0	31.5	36.0	40.5				
1.0	2.86	10.0	15.0	20.0	25.0	30.0	35.0	40.0					
1.1	3.15	11.0	16.5	22.0	27.5	33.0	38.5						
1.2	3.43	12.00	18.0	24.0	30.0	36.0							
1.3	3.72	13.0	19.5	26.0	32.5	39.0							
1.4	4.00	14.0	21.0	28.0	35.0								
1.5	4.29	15.0	22.5	30.0	37.5								
1.6	4.58	16.0	24.0	32.0	40.0								
1.7	4.86	17.0	25.5	34.0									
1.8	5.14	18.0	27.0	36.0									
1.9	5.43	19.0	28.5	38.0									
2.0	5.72	20.0	30.0	40.0									
2.1	6.01	21.0	31.5										
2.2	6.29	22.0	33.0										
2.3	6.58	23.0	34.5										
2.4	6.87	24.0	36.0										
2.5	7.15	25.0	37.5										
2.6	7.44	26.0	39.0										
2.7	7.72	27.0	40.5										
2.8	8.01	28.0											
2.9	8.29	29.0											
3.0	8.58	30.0											
3.1	8.87	31.0											
3.2	9.15	32.0											
3.3	9.44	33.0											

NOTE: This table is based upon arbitrary relationships and covers the entire range of possible machine capacity in pounds per hour. The actual capacity of the RANDO-WEBBER is affected by the kind and condition of the fiber processed, the amount of opening required, and the specifications laid down for an acceptable web. The machine capacity in pounds per hour can best be obtained by making capacity tests under the conditions specified.

with the base fiber in varying proportions ranging from 5 to 40% of the total blend. The blending operation may be carried out on any type of opener which will produce a uniform blend of fibers. The resultant blend is then fed directly to the RANDO-FEEDER and RANDO-WEBBER in combination for processing into the finished web. From the RANDO-WEBBER the web may be conveyed to a calender or a flat press having a compensator for the heat-pressure bonding operation. With the application of pressure, adhesion starts at approximately 230° F. but 300° F. gives faster bonding action. Temperature, pressure and time are inter-related with respect to the "fusion" or adhesion of the plastic fibers. The pressures used vary from 10 to 400 pounds per square inch with time varying from one minute to a few seconds.

2. Resin Application Method. *

In the "wet" or resin bonding process the finished web from the RANDO-WEBBER is impregnated with some suitable resin and then dried. A typical mill installation which includes four RANDO-FEEDERS and RANDO-WEBBERS, an Impregnator, Dryer, and Wind-Up is shown in Figure 12.

Types Suitable for Bonding Web Materials are:

1. Polyvinyl Acetate.
   Solids - can be dissolved in many types of organic solvents to the desired concentration.
   Emulsions - can be diluted to the desired concentration by adding water.

2. Polyvinyl Chloride.
   Can be handled the same as polyvinyl acetate.

3. Rubber Latex
   Natural
   Synthetic

4. Reclaim Rubber Dispersion

5. Stymers

6. Asphalt Emulsions

7. Starch

Use of Wetting Agents.

It is usually necessary to blend a suitable wetting agent with the resin being used in order to wet the fibers within a reasonable

* NOTE: Information on the use of plastic fibers and resins for fiber bonding work and their compounding, dyeing, etc., may be obtained from the various companies manufacturing such materials. We shall be glad to furnish additional information on sources of supply of materials and technical information to those interested.

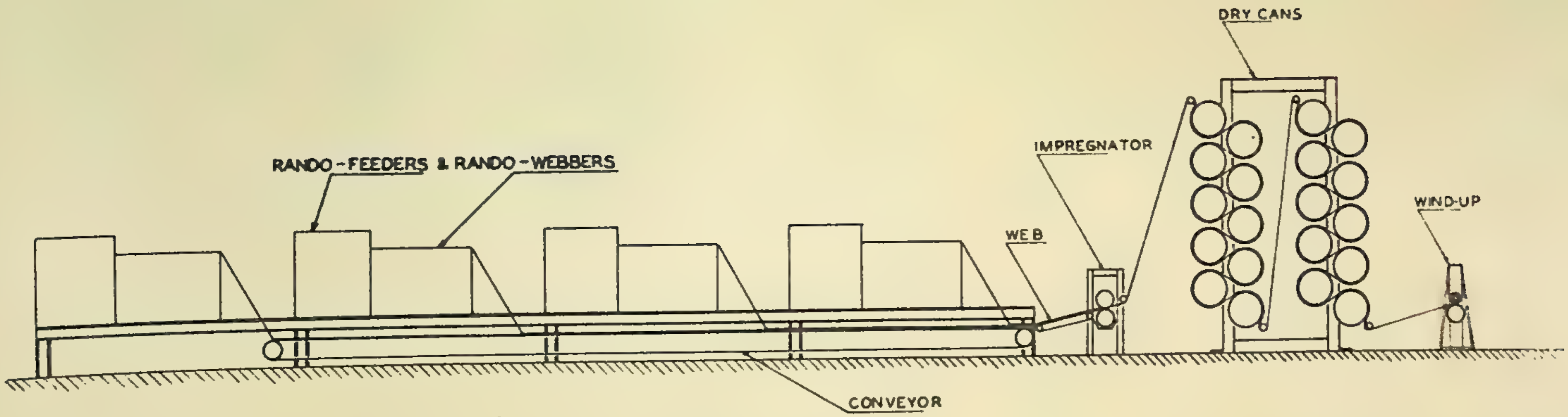

FIG. 12
TYPICAL MILL INSTALLATION

length of time. This is particularly true of unbleached or oily fiber. In some cases an additional impregnator for the wetting agent, called a "wetting-out" head is used ahead of the regular impregnator handling the resin. For some types of materials such as a glazed wadding, it may be desirable to wet and bind only the surface layers of fibers.

Use of Plasticizer.

Most types of resin can be compounded with plasticizers to vary the physical properties of the finished material. In this way the strength, flexibility, hand, absorbency, permeability, wet strength, etc. can be varied to meet certain requirements.

Dyeing.

Dyes and pigment colors may be added to the emulsions to color the finished product.

Printing.

Bonded fiber materials can be printed generally using the same pigments and equipment used for woven goods.

VI. TYPICAL MILL INSTALLATION.

The illustration shown, Figure 12, shows an installation of RANDO-FEEDERS and RANDO-WEBBERS mounted over a conveyor in order to build up a laminated web to thickness or weights per yard unobtainable with single installations.

The illustration shows the web treating equipment of Impregnator, Dry Cans and Wind-Up in sequence. Such an installation permits the use of liquid agents to good advantage.

Designs are under way for impregnating webs with granular bonding agents, however, there are so many such bonding agents available that each case must be considered by itself. The manufacturer is in position to suggest means for uniformly mixing granular substances with the fiber when forming the web.

VII. TENTATIVE MACHINE SPECIFICATIONS, INCLUDING WEIGHTS.

RANDO-WEBBER, Model 40 includes lap roll feed substantially as illustrated in Figure 3. The machine is furnished equipped with:

1. Internal air circulation and humidifier

2. Variable speed drives with hand wheel and pointer for feed and condenser control.

3. Individual push button starting switches for four enclosed motors, $2\frac{1}{2}$ H.P. total load, single condulet line connector.

4. Figure 13 provides outline dimensions, connections for air, water, electricity and drain with their approximate location and size.

5. Weight of the RANDO-WEBBER is approximately 2900 pounds.

RANDO-FEEDER, Model 40 complete substantially as illustrated in Figure 2. The machine is furnished equipped with:

1. Hopper capacity sufficient for approximately one hour's run.

2. The RANDO-FEEDER when attached to the Model 40 RANDO-WEBBER is inter-connected with the feed roll drive of the web machine. Sprockets, chain and chain guard for this connection are furnished with the Feeder.

3. One condulet connector for power supply with push button magnetic starting switch, $2\frac{1}{2}$ H.P. total load.

4. Figure 14 provides machine outline dimensions and points of connection for electricity and air discharge.

5. Approximate weight is 1900 pounds.

VIII. NEW EQUIPMENT, METHODS AND PRODUCTS.

The upgrading of waste or low-grade fiber is an important segment of the textile industry. In offering the RANDO-FEEDER and RANDO-WEBBER to the textile industry it is believed that a means has been made available for the upgrading of waste and low-grade fibers to make new products or to make old products in a new way.

There is evidence at hand that the unique principles used in the RANDO-FEEDER may have a significant place in processing staple fibers both natural and synthetic. The Feeder with its air bridge arrangement for forming uniform mats of fiber may find an important place in the processing lines of the mill. For instance, crosswise and lengthwise uniformity of the web between the picker and card has important bearing upon the uniformity of the yarn or thread. The RANDO-FEEDER which forms and controls the feed mat to close density tolerance when installed between the picker and card should materially aid in smoothing out or improving the product yard or thread. It may also find use in the synthetic fiber field as it permits feeding bulk staple fibers to a hopper to produce a uniform mat directly to a lap winder or to a card.

The people who have been directly responsible for the development of these two machines have been guided and encouraged by men that are prominent in the Textile Industry. It is their expressed opinion that the RANDO-FEEDER and RANDO-WEBBER represent innovations in textile

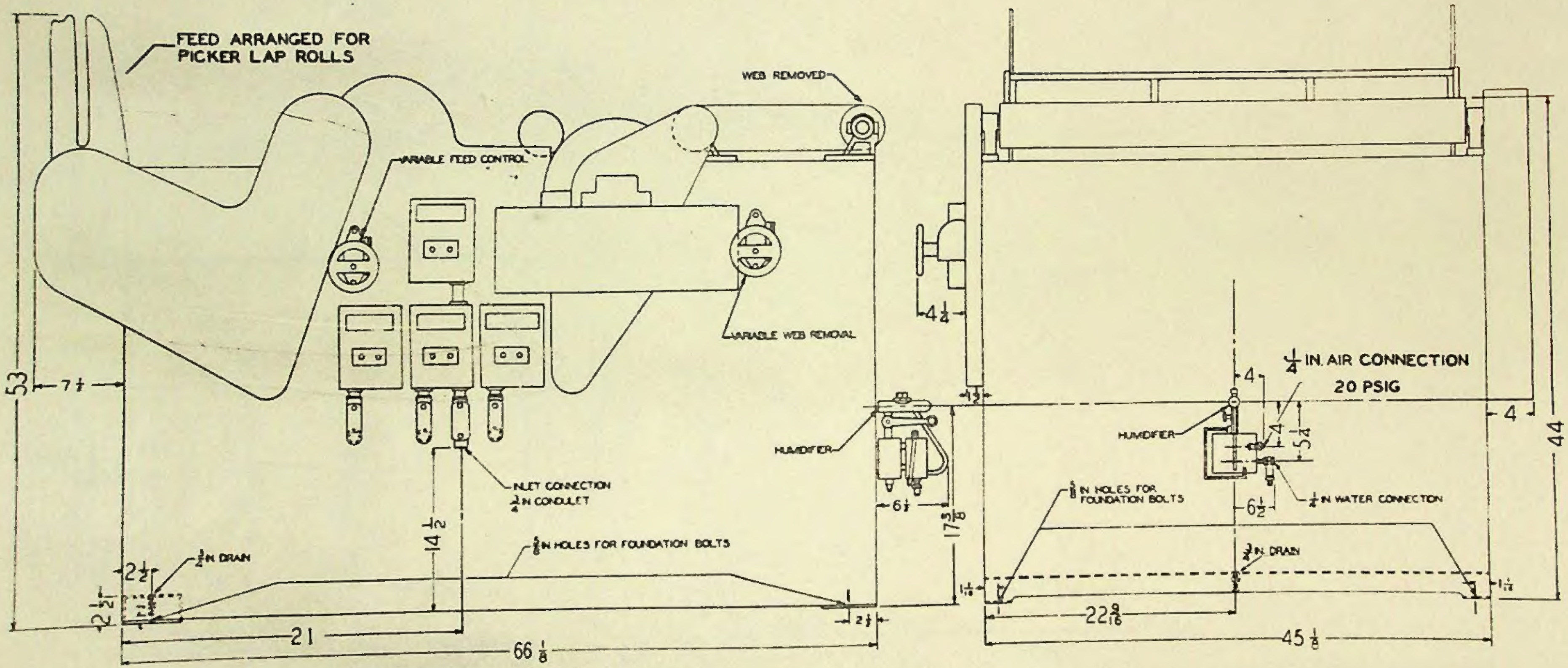

FIG. 13
RANDO-WEBBER — OVERALL DIMENSIONS AND SERVICE CONNECTIONS

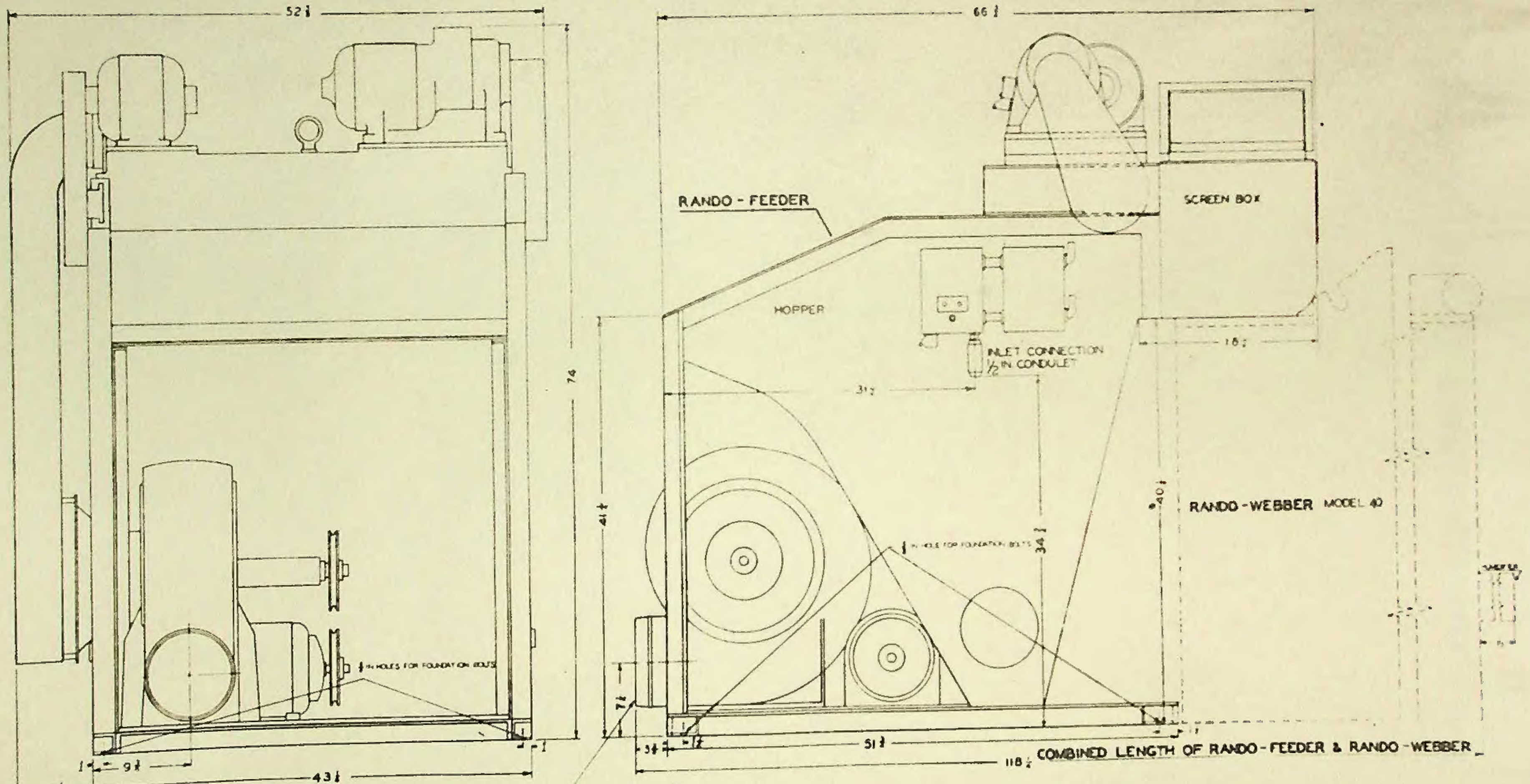

FIG.14
RANDO-FEEDER – DIMENSIONS AND SERVICE CONNECTIONS

processing and are a significant contribution to the industry. It is also recognized that problems will arise in applying these machines to the textile industry and perhaps mill men will see uses for the quip-ment that may not be evident at this time. The manufacturer and his representatives desire to aid in working out these problems and invite your inquiry.

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